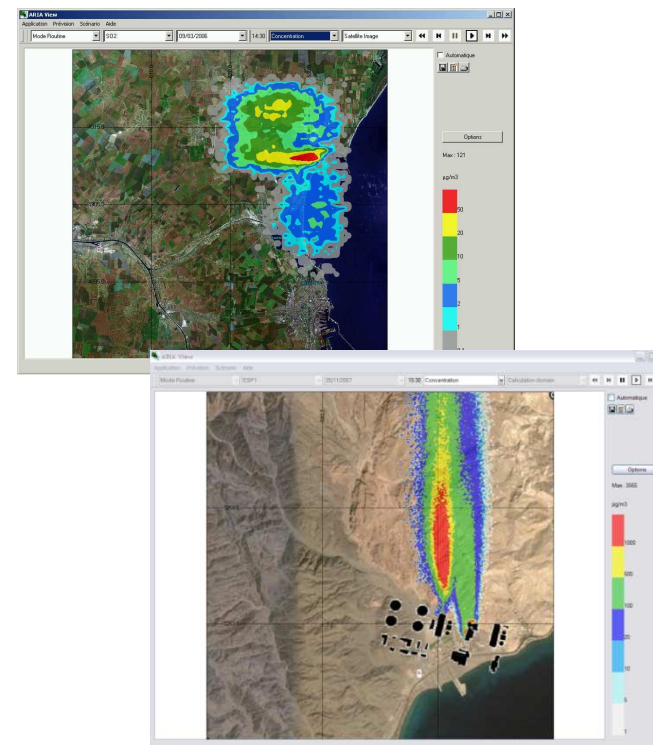
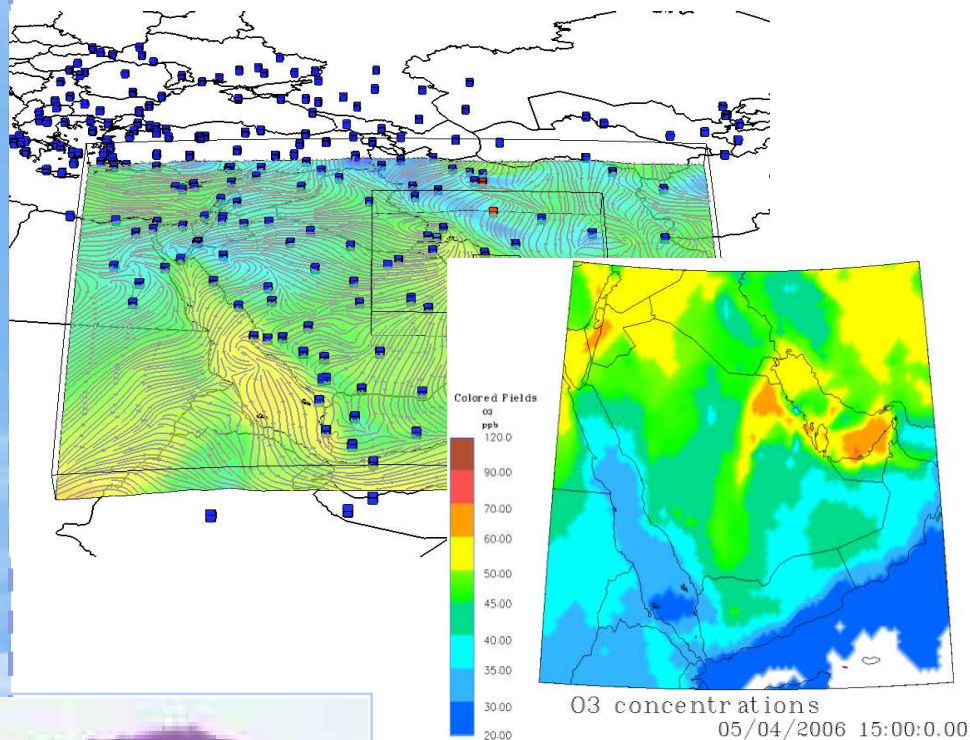
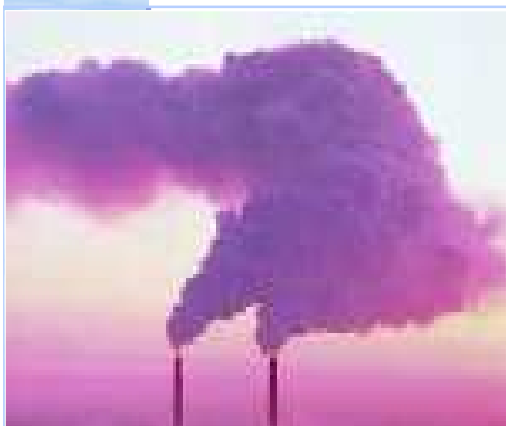


Air Quality Modeling



Jacques MOUSSAFIR – jmoussafir@aria.fr



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Telephone: +33 (0)1 46 08 68 70 – Fax: +33 (0)1 41 41 93 17
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ARIA Technologies : company profile

ARIA Technologies was founded in 1990 by a group of researchers from the R&D department of EDF, the French electricity board.

It is now an independent company, leader in its field in Europe. Its headquarters are located near Paris, with offices in France and sister companies in Italy, Brazil, India, Mexico.

One single field of activity:

Atmospheric Environment



One single concern: **modeling the atmospheric** **environment**

- from building scale to continental scale
- from simple screening models to full-blown CFD solutions
- keeping consulting, software, systems and training tightly linked
- with an international and open approach, close to top R&D centres.



ARIA Technologies : company profile

■ Consulting

- ✓ Impact and Risk studies / Regulatory assessments
- ✓ Urban & Regional Air Quality
- ✓ Applied Meteorology: wind energy, building



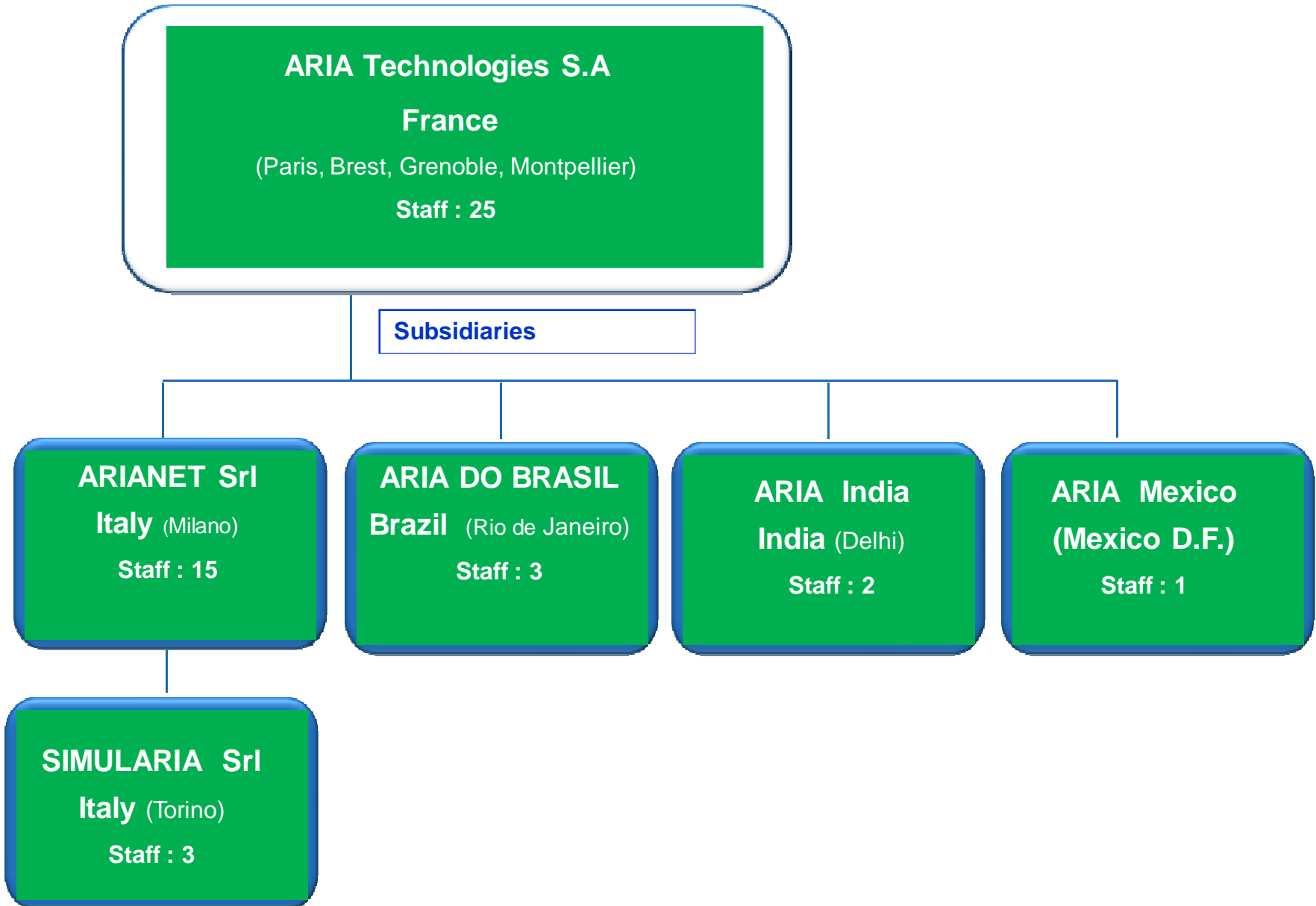
■ Software and systems

- ✓ Off the shelf complete solutions
- ✓ Specific developments
- ✓ Training



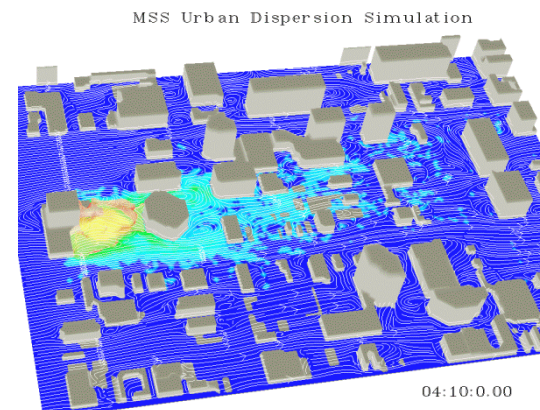
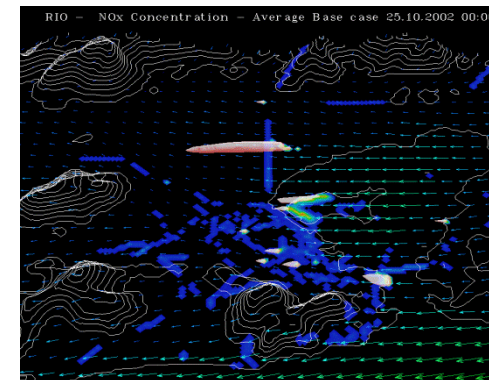
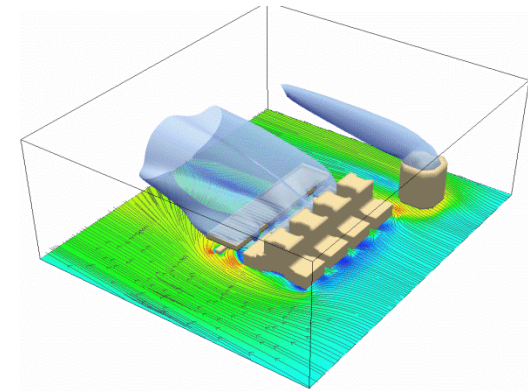


ARIA Technologies



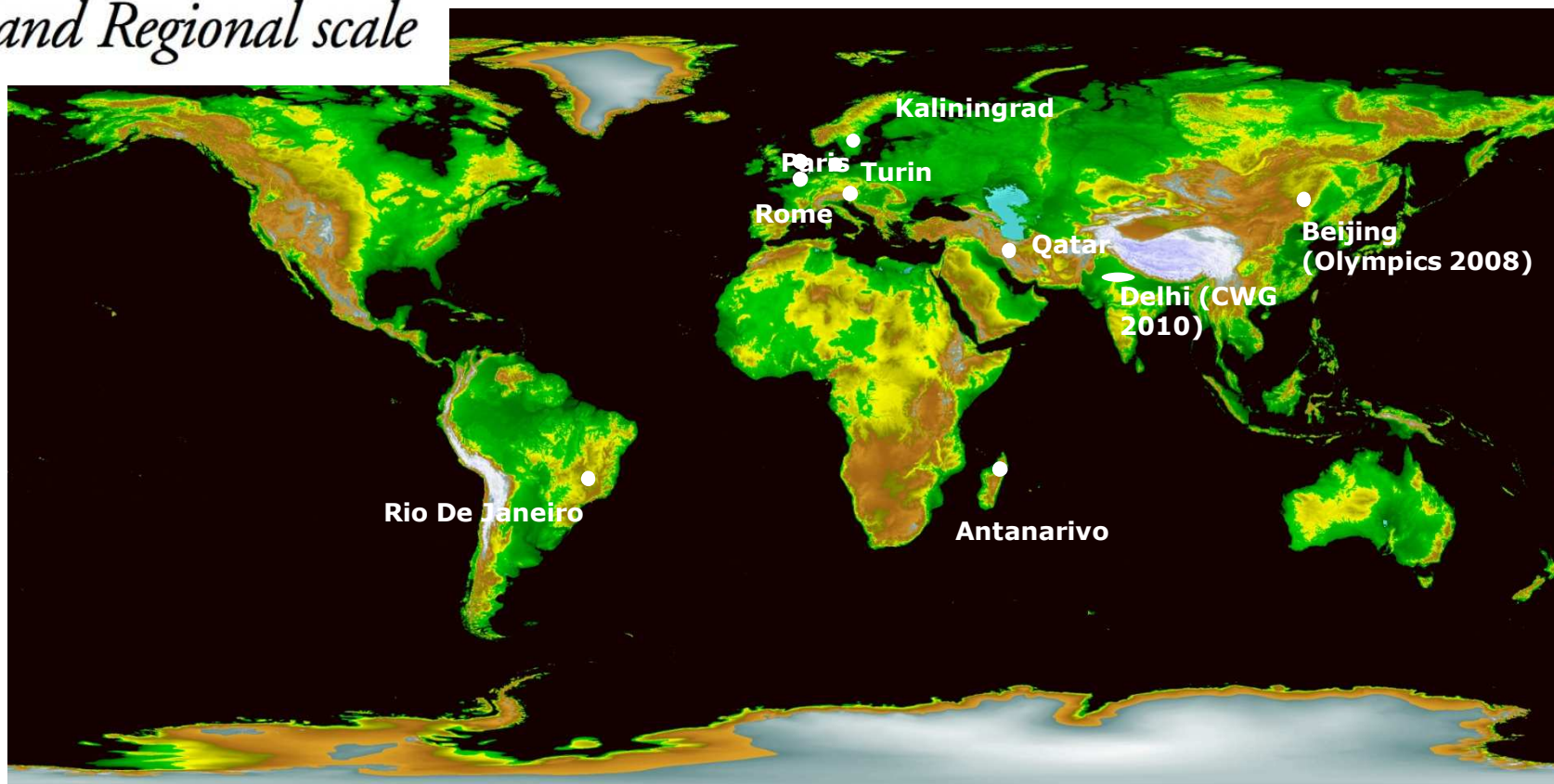
ARIA Technologies : clients

- **Industry** (TOTAL, RENAULT, EDF, SAUDI ARAMCO, TECHNIP, QP ..)
- **Public Sector** (National Agencies, World Bank, Paris, Roma, Rio de Janeiro, Beijing)
- **Defence** (France, UAE, USA..)

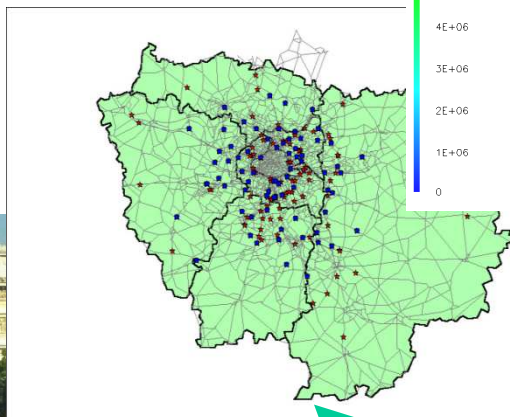
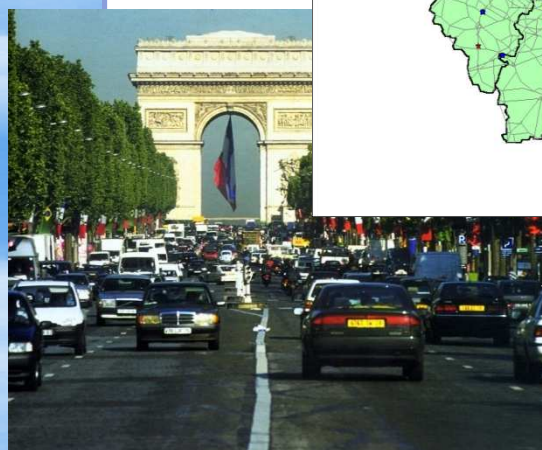
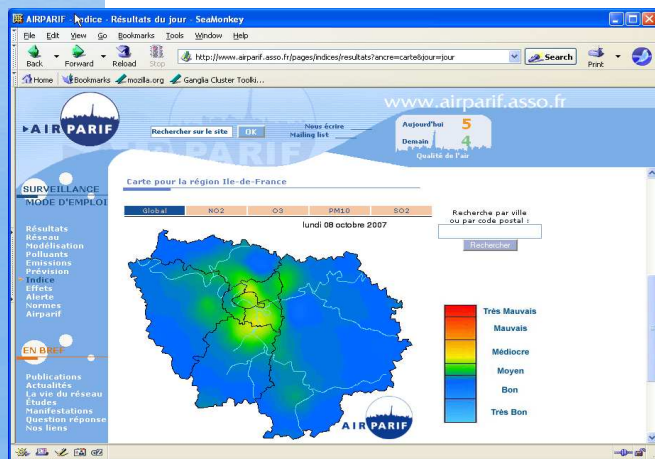


*Air quality
simulation and
forecast at Urban
and Regional scale*

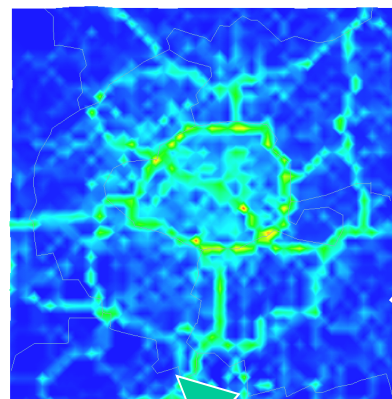
Key international references



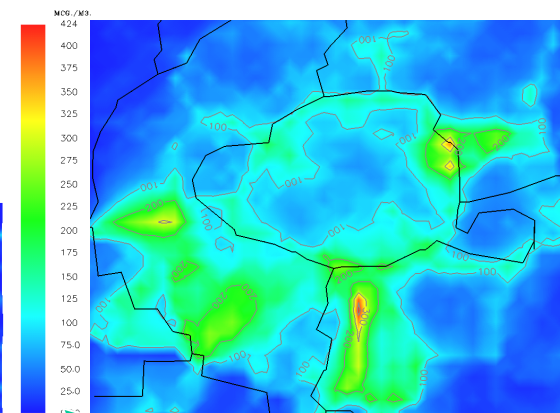
Paris : AIRPARIF System



NOX
MOY./8
1E+07
9E+06
8E+06
7E+06
6E+06
5E+06
4E+06
3E+06
2E+06
1E+06
0



06:00:0.00 TU



From emissions to
Air pollution

From traffic
to emissions

Description of traffic

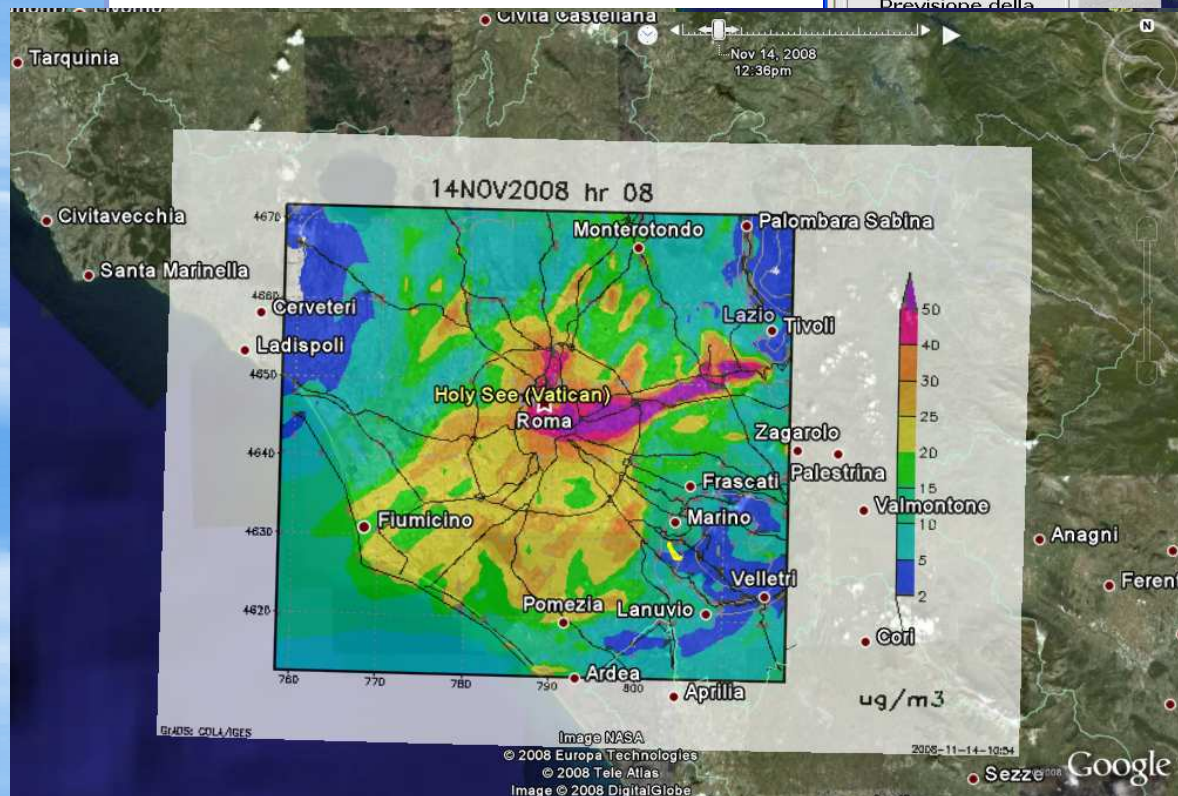
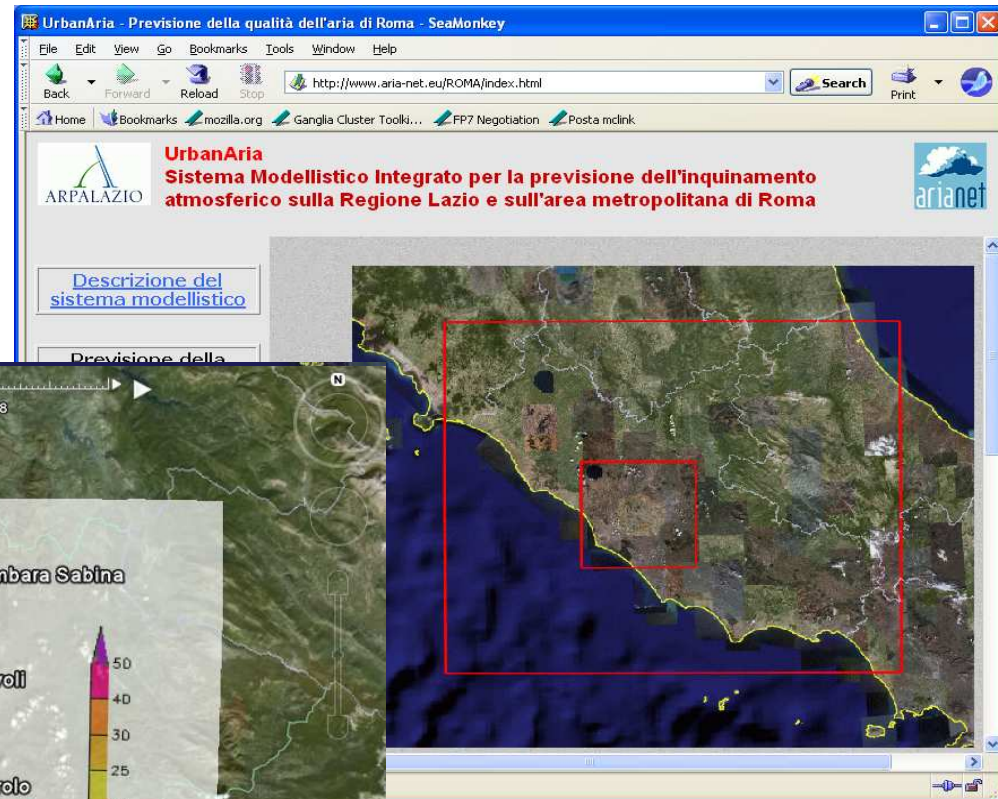


Rome : Air Quality Forecast System



http://www.aria-net.eu/ROMA/index_en.html

- ➔ On-line forecast
- ➔ Scenarios

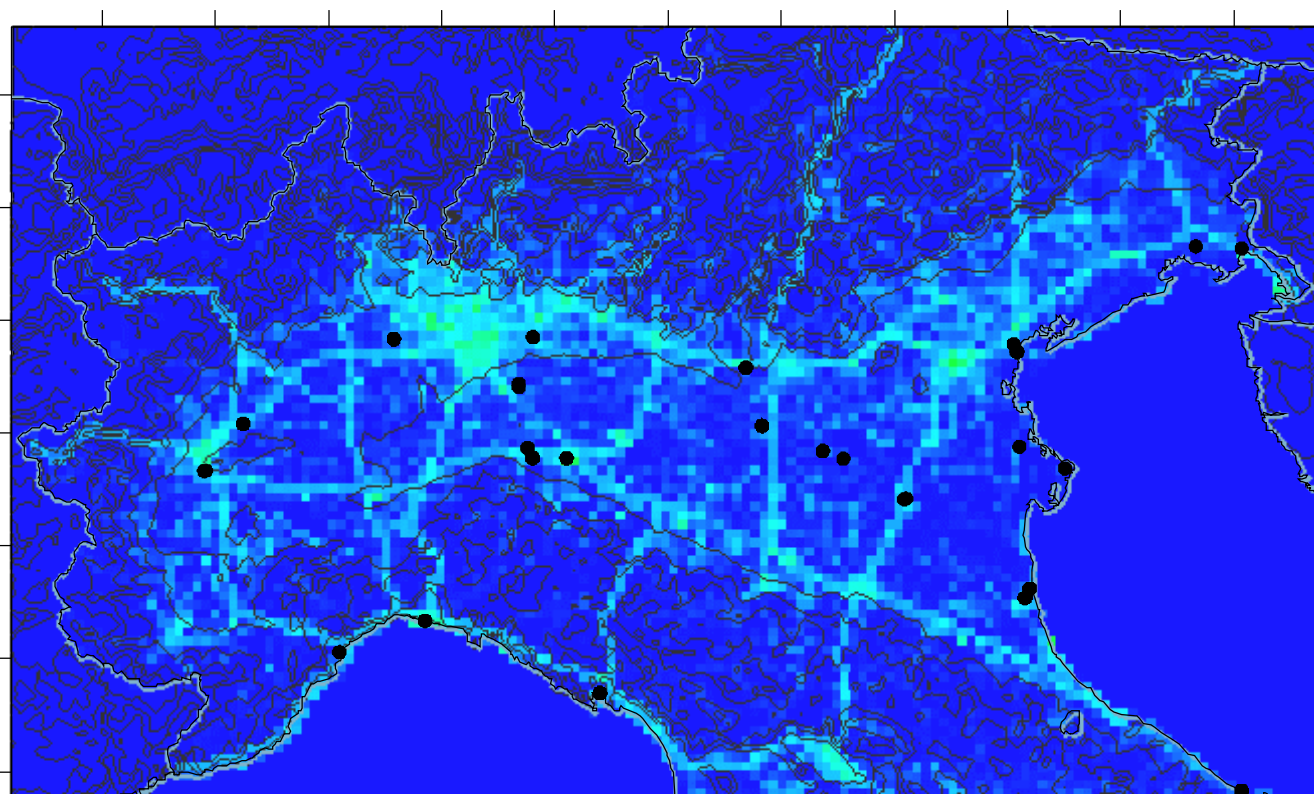


Northern Italy : scenarios



Ministero dell'Ambiente
e della Tutela del Territorio

H 00:00:0.00

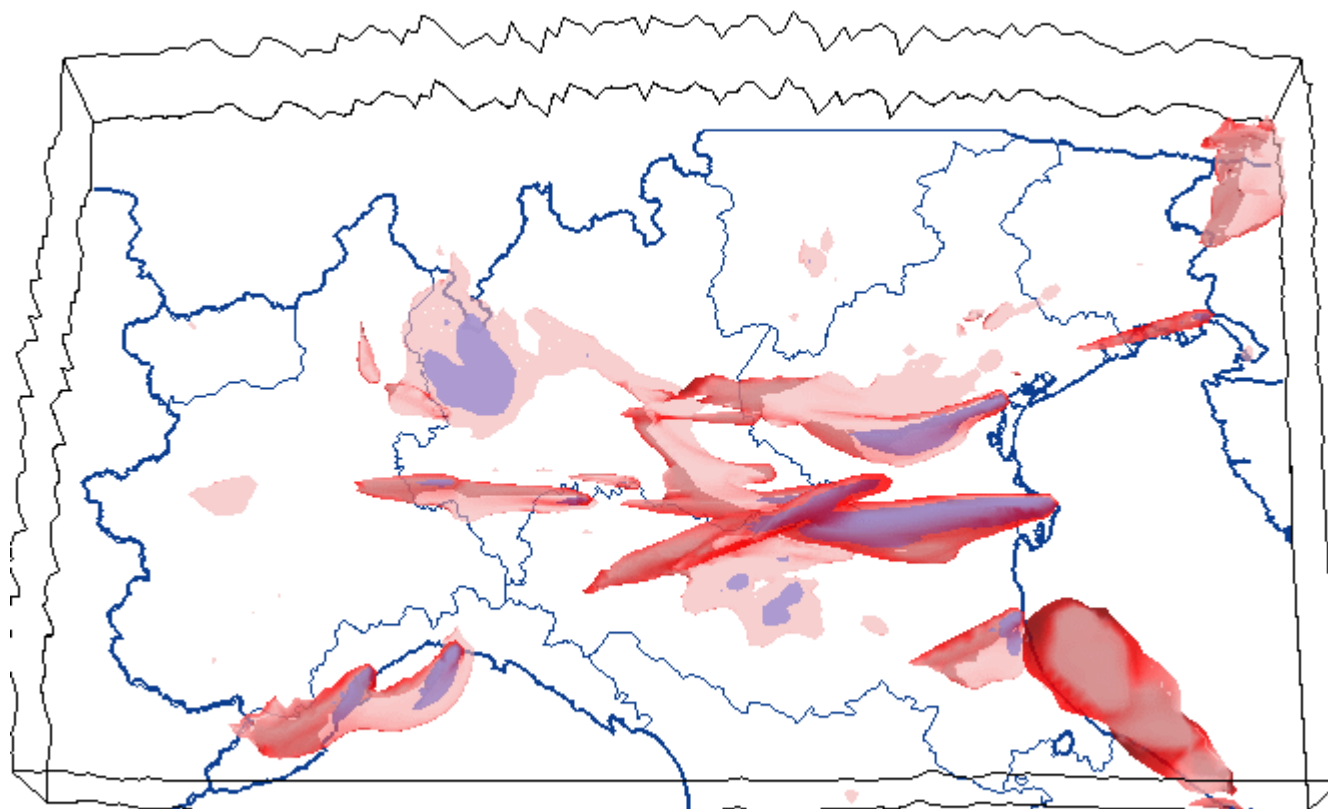


Northern Italy : scenarios

ENEA

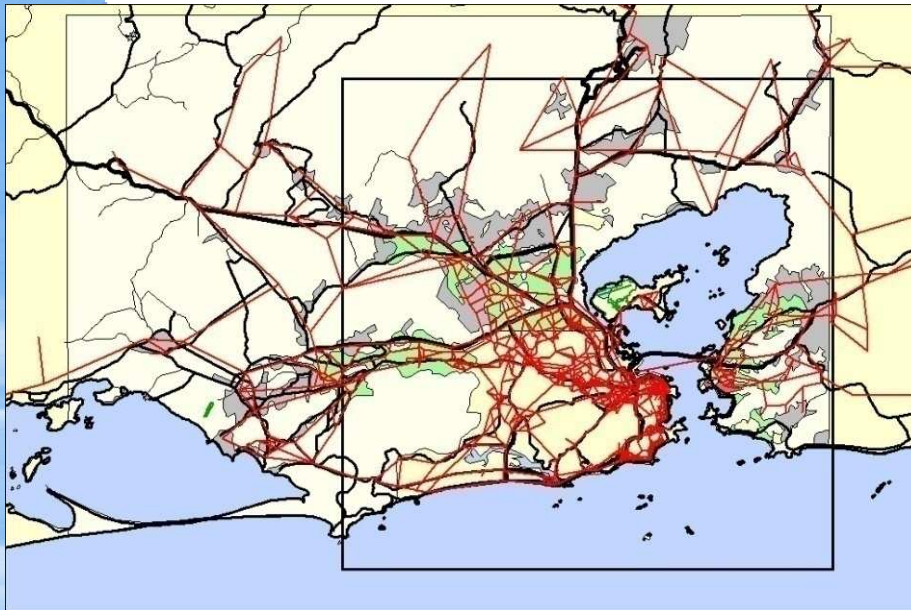
Ministero dell'Ambiente
e della Tutela del Territorio

01/20/1999 H 00:00:0.00

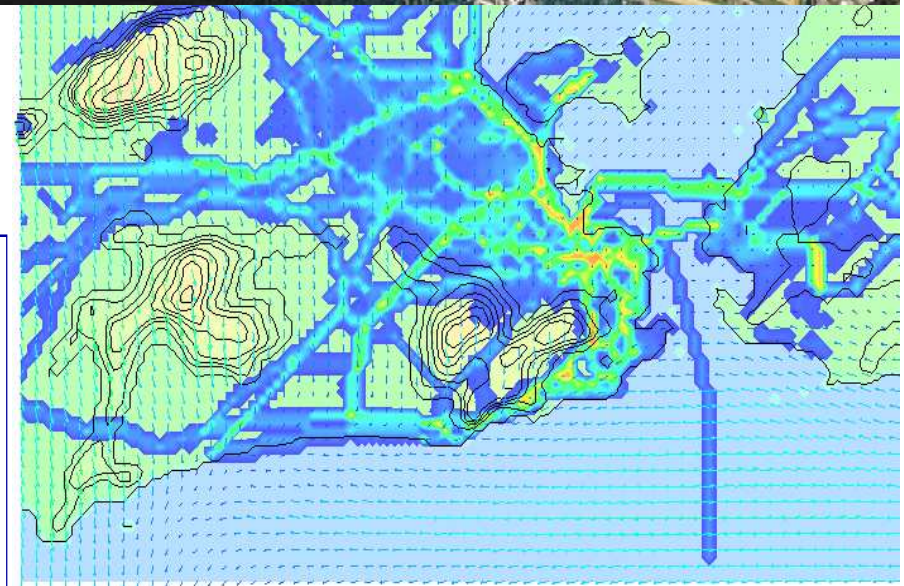


Rio de Janeiro: Scenarios and Forecast

Traffic model flows for Rio de Janeiro
Data on about 8000 links



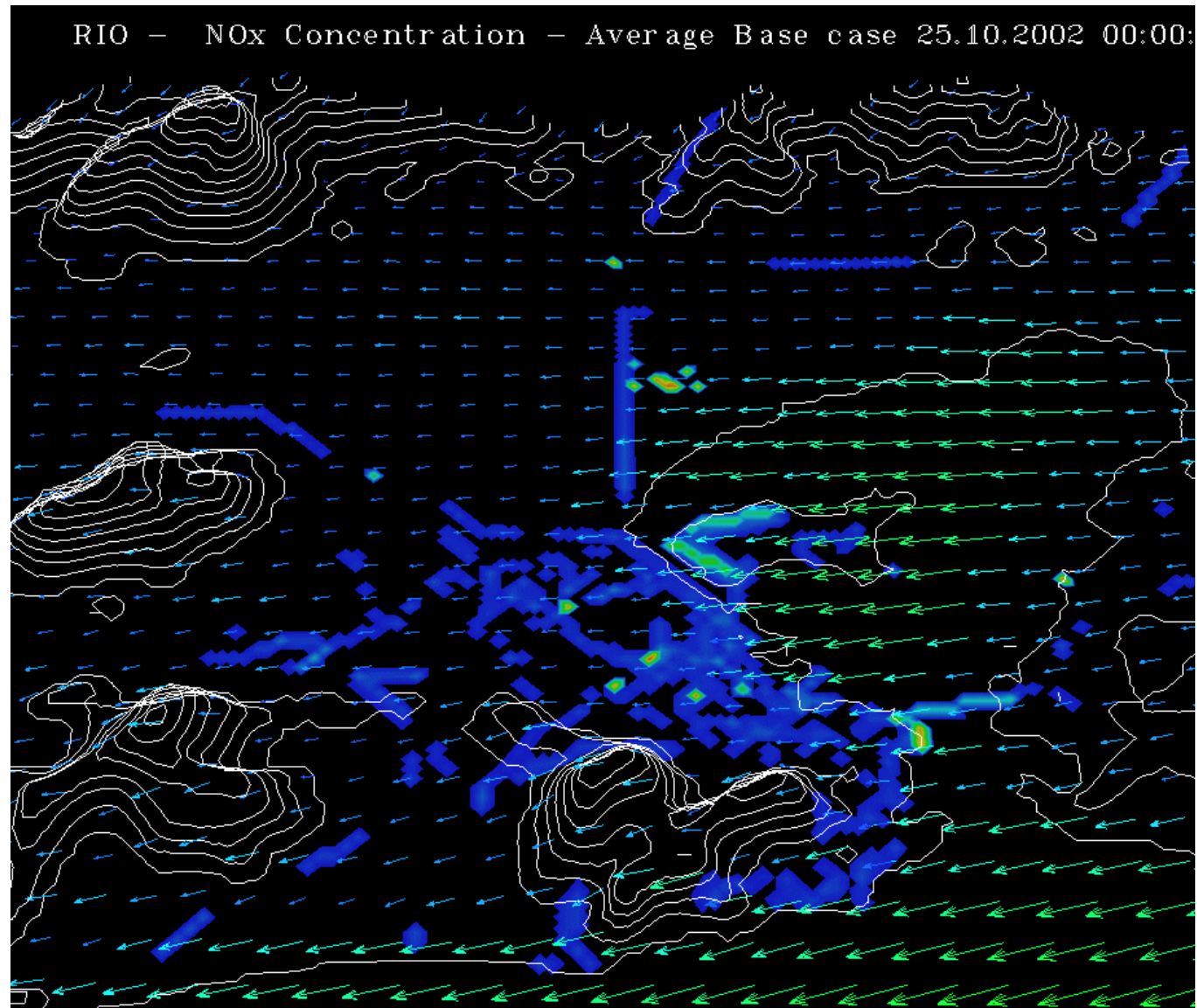
Flexible Emission factors
(COPERT based structure) as a
function of vehicle speed
Adapted to Rio situation
Evaporative VOC emissions possible



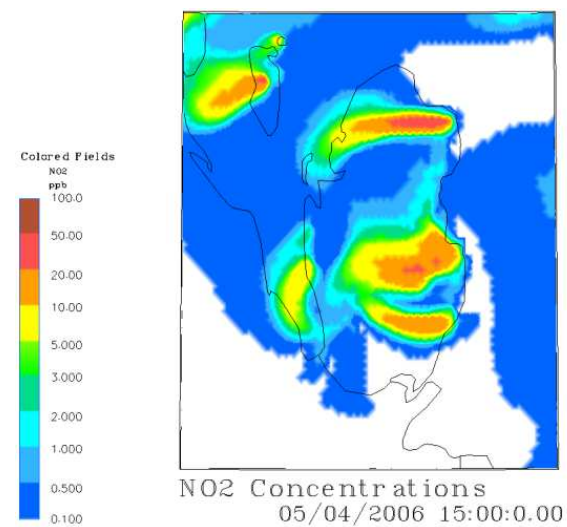
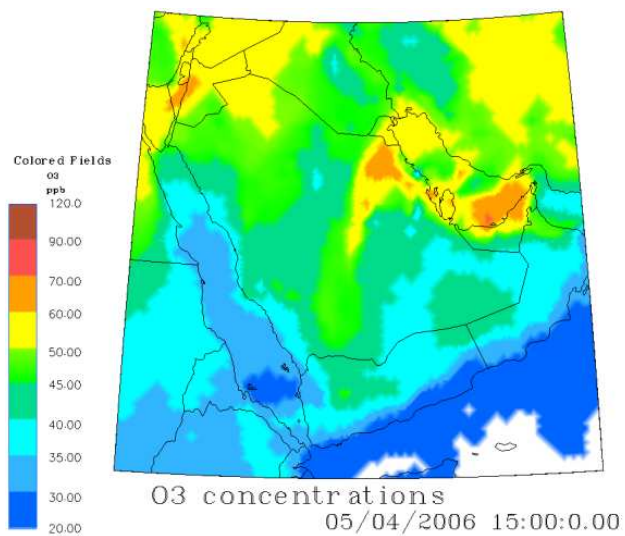
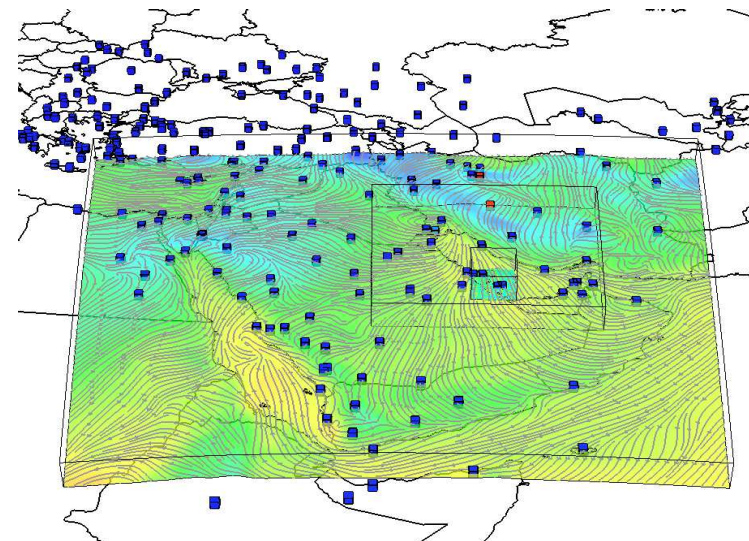
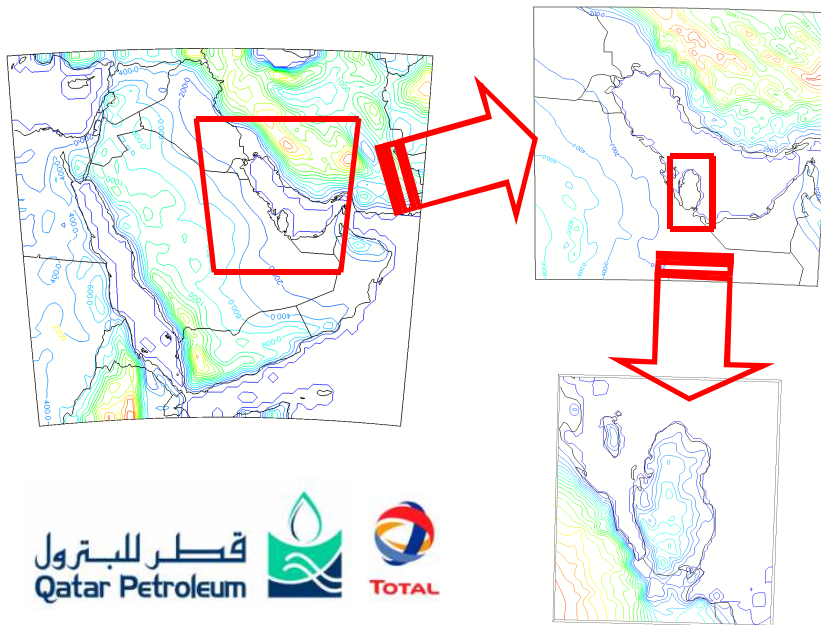
NOx Emissions 15:00 UT 13.08.04

Rio : Simulation 3D

Hourly
evolution of
NOx emissions
at ground
(all sources)
and
**3D NOx
Concentration**
(pink
isosurface)

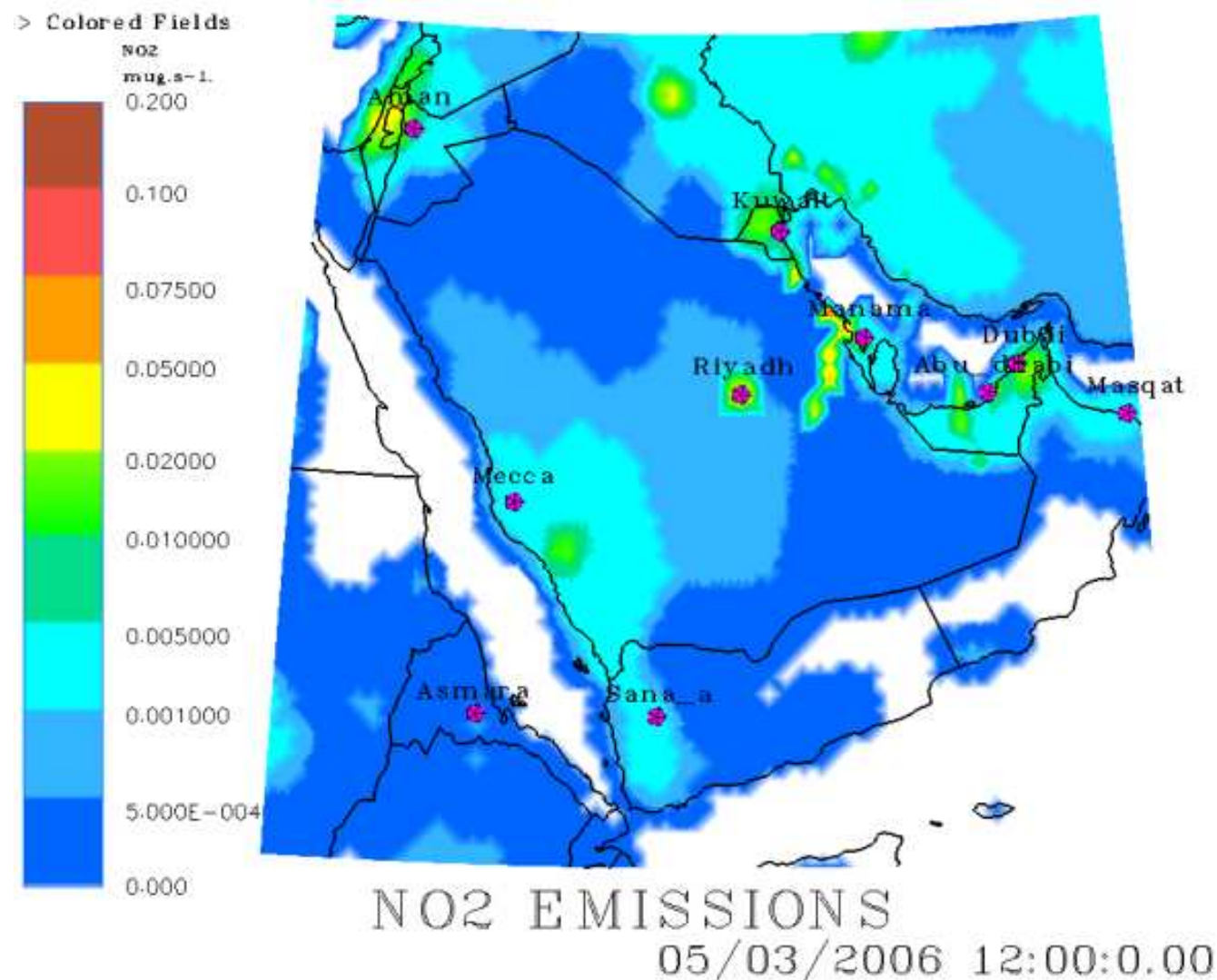


Qatar Air Quality Model

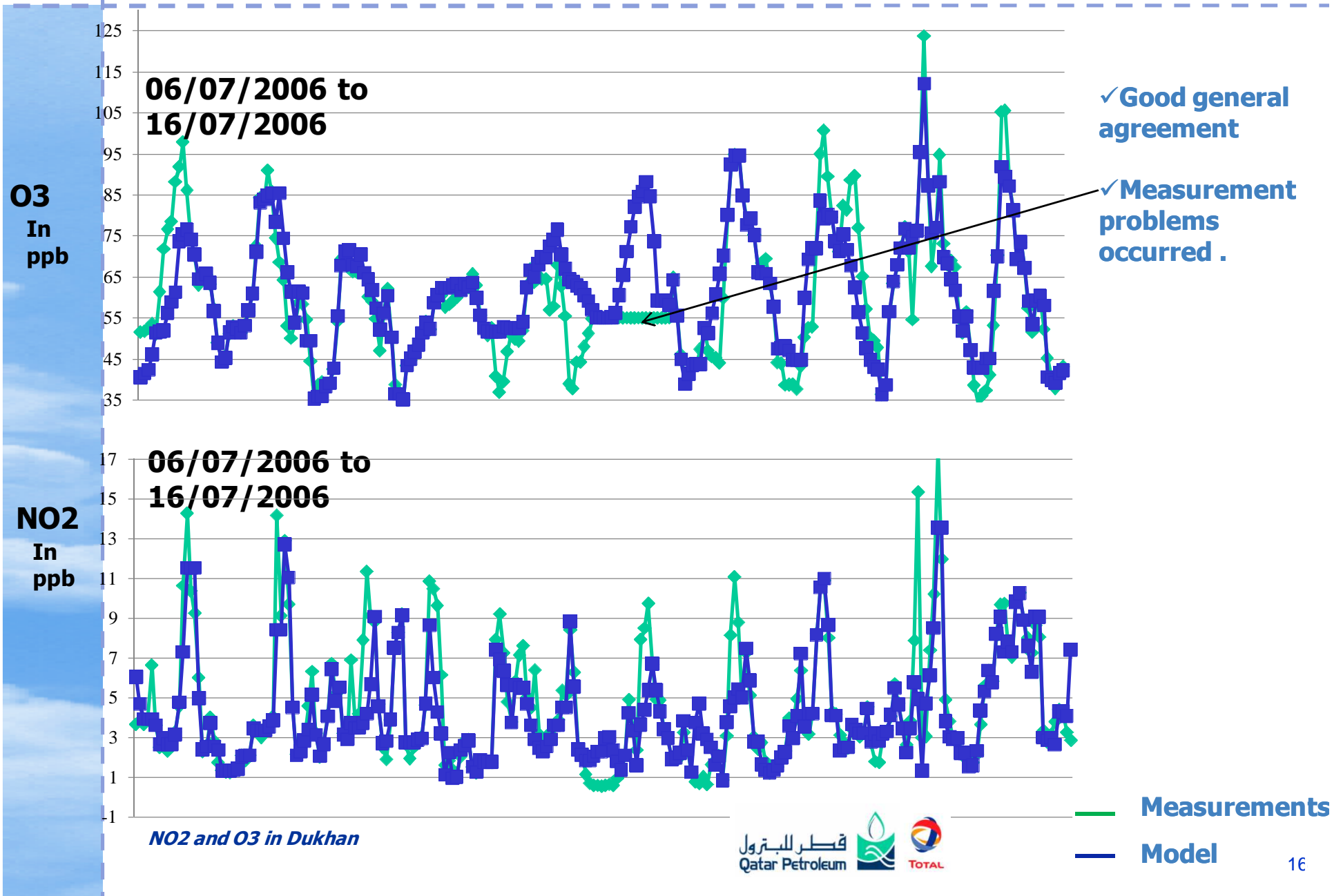


Qatar Air Quality Model

Multi-scale emission inventory
Example of **large scale** NO₂

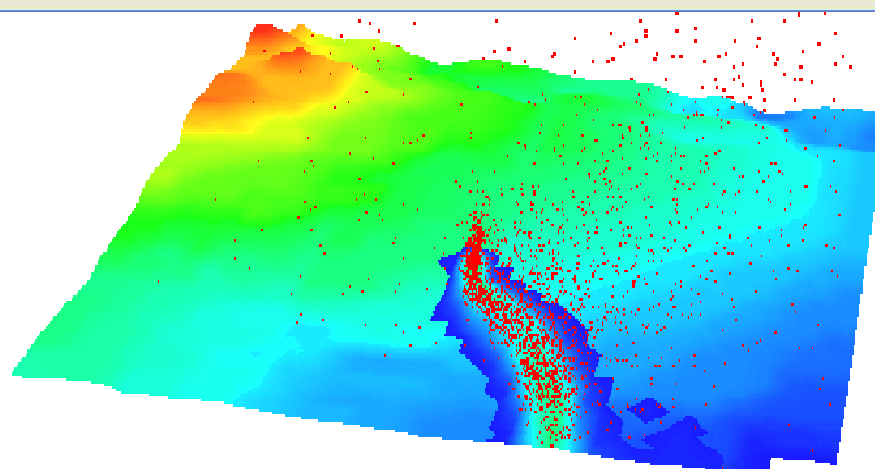
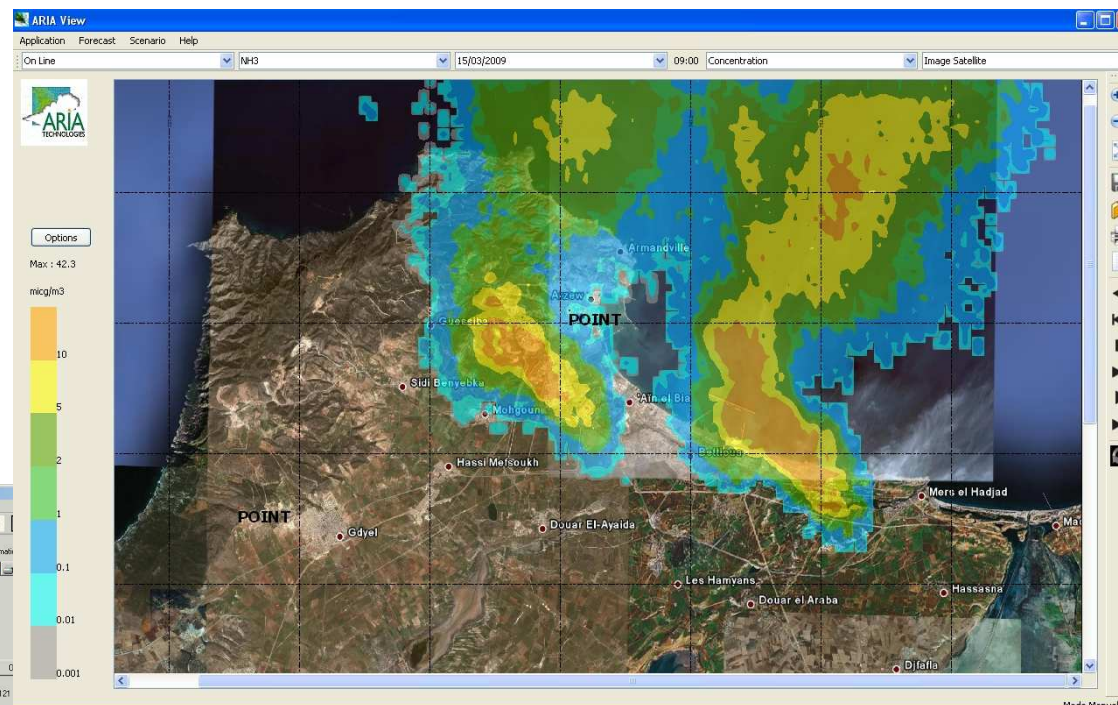
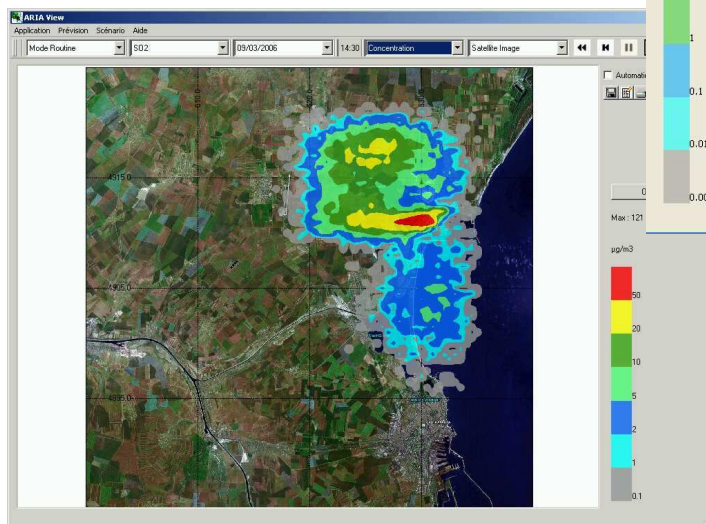


Qatar Air Quality Model : validations



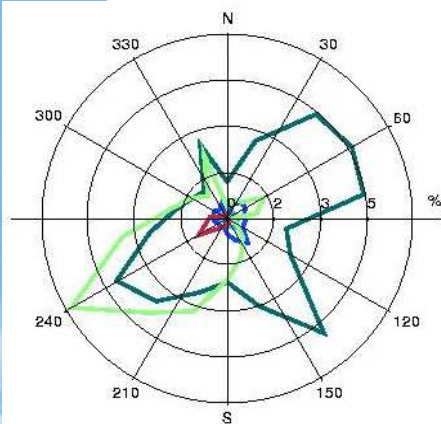
View

*Continuous air
modelling at
industrial sites*



Principle of operation

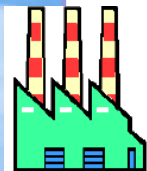
Meteorological data (site station - forecast)



Data collection, model runs



Emission data, computed / measured

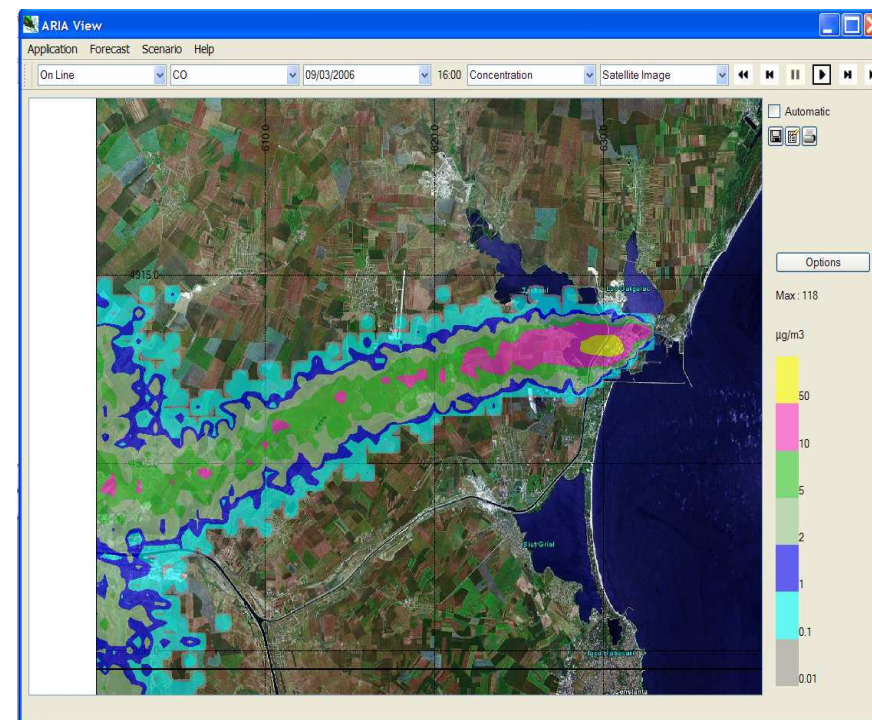


kg/j

	SO ₂	CO	PS	Pb
J1	264	30	48	0,6
J2	222	25	40	0,5
J3	342	39	62	0,8
J4	350	40	64	0,8
...				
J28	425	48	77	1,0
J29	369	42	67	0,9
J30	201	23	36	0,5

Maps of results (Web compatible)

- Concentrations, depositions
- Odours
- Tracking critical points
- Backwards trajectories



- Manage exposure and risk
- Broadcast results
- Evaluate health risks

ARIA View™ for industrial pollution

Rompetrol
refinery,
Constanta,
Romania

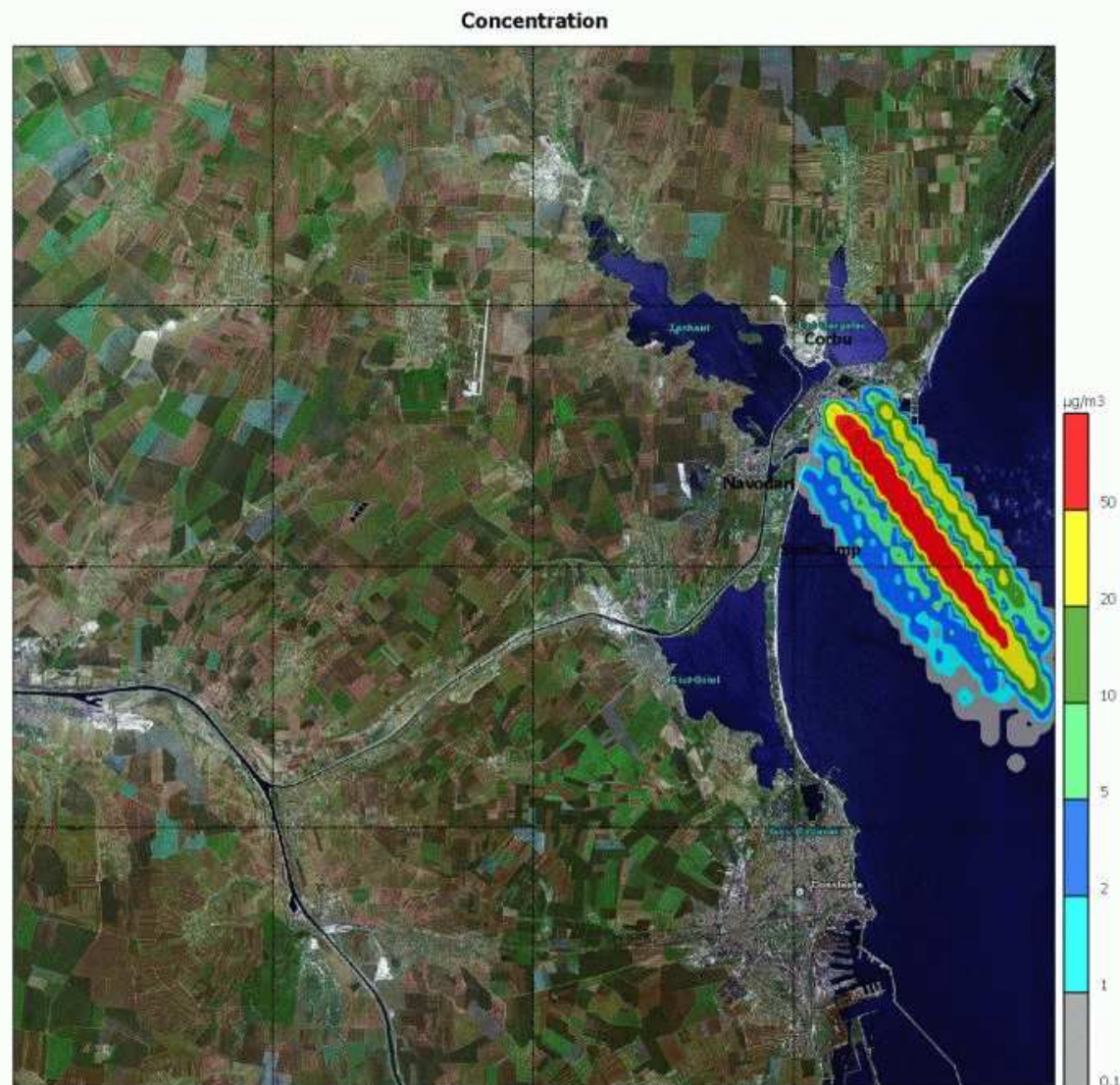
ROMPETROL

Rapport journalier

VOC

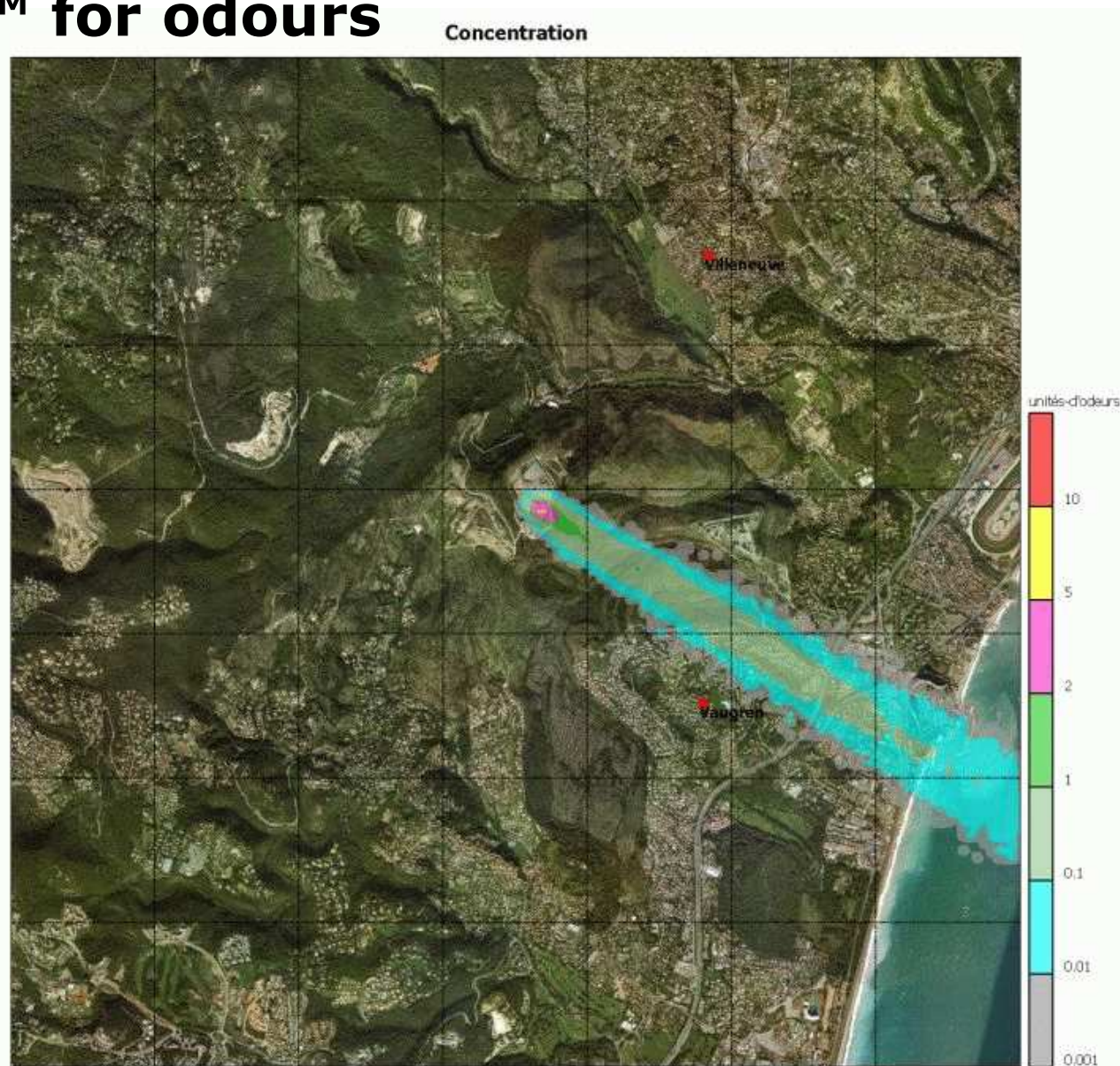
Table des maxima de concentrations

Heure	Position (X Km, Y Km)	(Distance Km/Angle)	Position (Lat, Long.)	Valeur maximale
00:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	243 µg/m³
01:00	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	247 µg/m³
01:30	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	212 µg/m³
02:00	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	199 µg/m³
02:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	172 µg/m³
03:00	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	129 µg/m³
03:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	106 µg/m³
04:00	(630,0,4911,5)	(1,1,91)	(28,6309,44,3 443)	75 µg/m³
04:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	87 µg/m³
05:00	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	119 µg/m³
05:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	155 µg/m³
06:00	(631,0,4911,0)	(0,5,6)	(28,6433,44,3 396)	161 µg/m³
06:30	(630,5,4911,0)	(0,7,89)	(28,6370,44,3 397)	198 µg/m³



ARIA View™ for odours

Landfill,
Villeneuve-
Loubet,
France



Conclusions

- Multi-national SMEs are fun and they are a nice place to grow your skills and vision
- Innovation keeps us alive
- Please contact:
 - jmoussafir@aria.fr



HARMO13 Paris Conference



Important dates

- Now: sign up at the conference website (www.harmo.org/harmo13) in order to receive e-mails with updated information
- Short abstracts (less than 350 words) should be received by **November 15, 2009**
- Confirmation for acceptance of contributions will be made by **January 31, 2010**
- Five-page extended abstracts should be submitted by **March 31, 2010**

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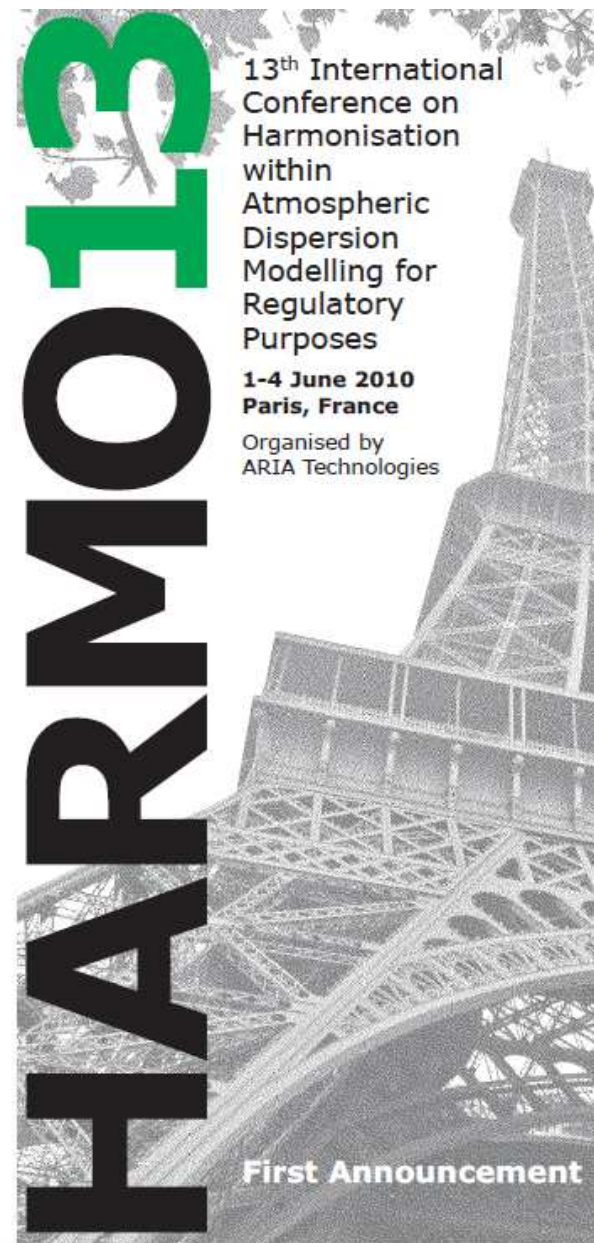
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 Internet: www.harmo.org/harmo13



13th International
 Conference on
 Harmonisation
 within
 Atmospheric
 Dispersion
 Modelling for
 Regulatory
 Purposes

**1-4 June 2010
 Paris, France**

Organised by
 ARIA Technologies

First Announcement